FIGURE 1

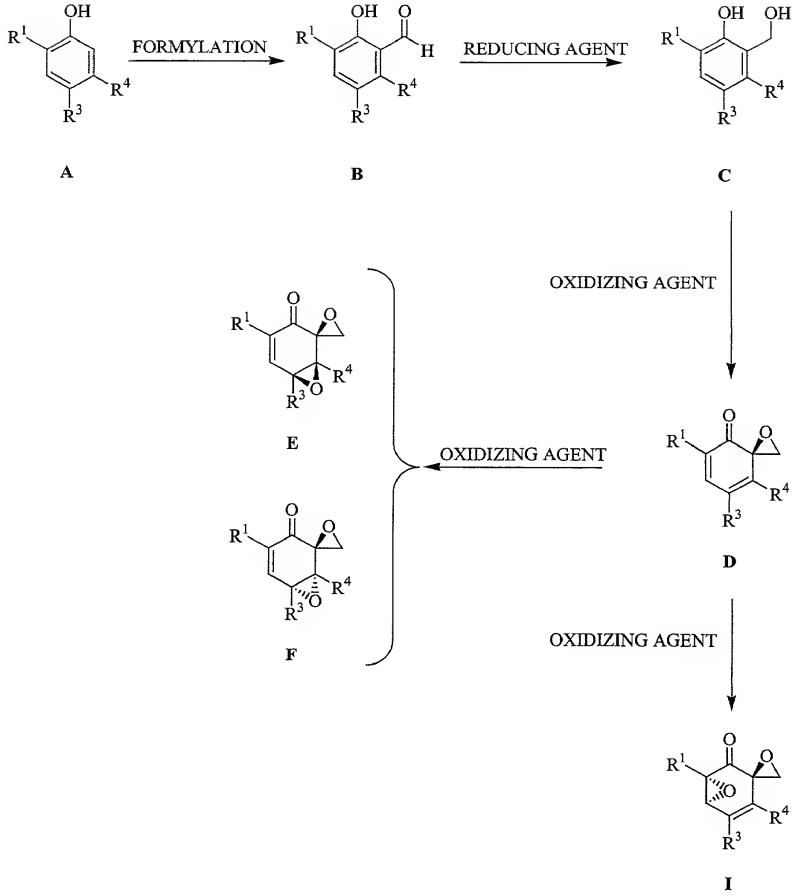
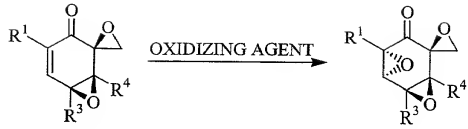

OH
R1
R4
R3
FORMYLATION
O
H
REDUCING AGENT
OH
A
B
C
OXIDIZING AGENT
E
F
D
I

FIGURE 2



E **G**

F **H**

FIGURE 3

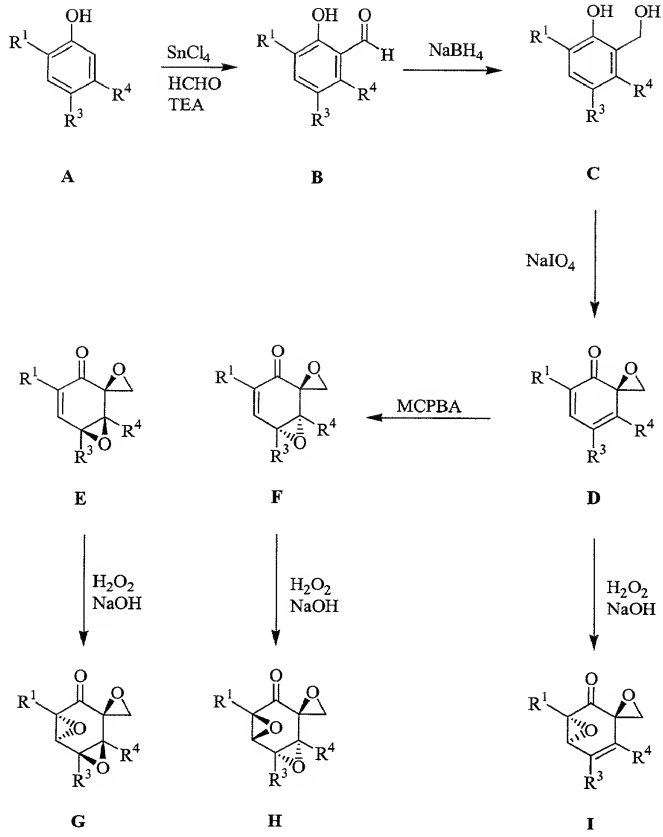
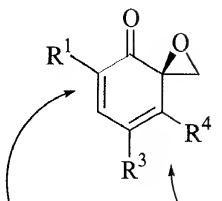

OH
R1
R4
R3
A
SnCl4
HCHO
TEA
OH
O
H
B
NaBH4
OH
OH
C
NaIO4
D
MCPBA
E
F
H2O2
NaOH
G
H
I

FIGURE 4



Epoxidized by nucleophilic oxidizing agents
(e.g. basic hydrogen peroxide, t-butylhydroperoxide, etc.)

Epoxidized by electrophilic oxidizing agents
(e.g. mCPBA, mono-perphthalic acid, etc.)